TERRA Transportation Engineering and Road Research Alliance
Partnering for Roadway Innovation
July 2010
www.TerraRoadAlliance.org

Greenroads

Road construction is an $85 billion a year industry in the United States. While the building industry has had Leadership in Energy and Environmental Design (LEED) certification available since 1998, no generally accepted system is in place to certify sustainably built roads. The Greenroads system, developed by the University of Washington and CH2M Hill, is an attempt to provide that metric.

Greenroads is the first rating system for sustainable road design and construction. It awards points for a list of sustainable choices and practices and can be applied to new, reconstructed, and rehabilitated roads. The rating system evaluates sustainability trade-offs and decisions, encourages greener practices and innovation, and confers marketable recognition on projects.

The goals of Greenroads are threefold: to recognize companies already using sustainable methods; to provide a catalog of ideas for greener practices; and to offer an incentive for agencies and companies to build more environmentally friendly roads.

Projects have to fulfill basic building, waste, pollution, lifecycle and outreach plans, and can then earn extra points for using recycled or local resources, reducing their reliance on fossil fuels, minimizing water use, and implementing smart traffic management systems.

According to its developers, the Greenroads standard helps show the public that the road construction industry can become more sustainable.

Native revegetation in Yellowstone National Park

Certification requirements

Greenroads evaluates a road's overall environmental and social impact, taking into account a variety of factors ranging from construction materials and practices to noise pollution, habitat control, and bike lanes. Credits include, but are not limited to, concepts such as urban heat island reduction, pervious pavements, and the use of regional materials.

Greenroads offers four certification levels: certified, silver, gold, and evergreen. For a project to be certified, it must meet 11 mandatory best practices in areas such as noise control, storm water mitigation, and waste reduction. In addition, a project must receive a minimum of 32 voluntary credit points (out of a possible 118).

Project requirements, similar to prerequisites in the LEED system, include an environmental review process, a lifecycle cost analysis, a lifecycle inventory, a quality control plan, noise mitigation, waste management, a pollution prevention plan, low-impact development, a pavement management system, a site maintenance plan, and educational outreach.

Voluntary best practices include minimizing light pollution, using recycled or locally produced materials, incorporating quiet pavement, creating access for bicyclists and pedestrians, creating places for wildlife to cross, and providing views of scenery.

Cost

So far, there are no completed certified Greenroads projects. However, the Greenroads team is working on several case studies nationwide. In comparison, LEED projects certified by the U.S. Green Building Council traditionally have cost more upfront but less over their lifetimes.

How green is road construction now?

Road builders currently use a high amount of recycled hot-mix asphalt (HMA) and portland cement concrete (PCC). Up to 80 percent of old HMA is recycled. But the industry could do better. Most agencies currently limit the amount of reclaimed asphalt pavement in HMA to between 10 and 30 percent. The majority of aggregate used in the United States is from virgin aggregate, rather than recycled.

Other sustainable practices in road construction could help reduce the amount of impervious surface (and the subsequent storm water runoff), address urban heat island effects, reduce diesel emissions during construction, and mitigate noise during construction and road use.

Implementation

The Greenroads development team plans to begin offering certification by late 2011. Currently, the team has funding for a limited number of pilot projects. Those funds are committed, but team members are willing to take on new projects for agencies that can fund them. Once Greenroads is fully developed, project teams will apply for points by submitting specific documentation in support of the project requirement or voluntary credit they are pursuing. These documents, which can range from project specifications to field documentation, are verified by an independent review team. There will likely be a fee for the document review.

Limitations

Greenroads is a project-based system that applies to the design and construction stages of building new or rehabilitated roads. It does not certify or monitor the operation phase of the road, although it does include required and voluntary credits that focus on maintenance and preservation activities (such as an optional lifecycle assessment credit).

In addition, Greenroads does not include sustainability measures that are already covered by current U.S. regulation, such as the Clean Water Act or the Americans with Disabilities Act (ADA), so it is not an absolute measure of sustainability. A key goal of Greenroads is to promote sustainability best practices and to spur innovation and construction decisions that go beyond regulatory requirements.

Who is using the Greenroads metric?

- Minnesota Department of Transportation (informal pilot project): Highway 95 from Highway 97 to Stillwater. The project includes grading, signals, paving, and ADA improvements in both a rural and urban environment. Expected completion: 2010.
- Western Federal Lands Highway: seven projects in progress, including a 10-mile stretch on the western part of the Grand Loop in Yellowstone National Forest and a 10.7-mile stretch of Fernan Lake Road in the Idaho Panhandle National Forest.
- Oregon Department of Transportation: four projects in progress.
- British Columbia Ministry of Transportation: four completed projects.
- Other agencies participating at an informal level.

Similar metrics

The Federal Highway Administration's Green Highways initiative is working toward a similar goal: incorporating sustainability into the nation's roads. The Greenroads team is currently working on a "self-evaluation tool and model process" for sustainable highway development for the FHWA, with a final product due at the end of 2010.

The New York State Department of Transportation, a TERRA member, is developing a GreenLITES system based on ideas from an earlier version of Greenroads.

The Wisconsin Department of Transportation (WisDOT), also a TERRA member, currently does not use the Greenroads rating system, but the department is working to develop a green roads rating system for use in the state. In addition, WisDOT is investigating the possibility of participating in U.S. Environmental Protection Agency WasteWise Program.

For further reading

- *Greenroads Rating System v1.0* (University of Washington and CH2M HILL, 2010)
- The Greenroads Roadway Sustainability Performance Metric (greenroads.us)

Links to these resources are on the TERRA Web site at www.TerraRoadAlliance.org.

New alignment in Yellowstone National Park

About TERRA

The Transportation Engineering and Road Research Alliance, or TERRA, brings together government, industry, and academia in a dynamic partnership to advance innovations in road engineering and construction, including issues related to cold climates. More about TERRA is online at www.TerraRoadAlliance.org.

For more about TERRA, please contact:

- Stephanie Malinoff, Manager, Events and Outreach Services, Center for Transportation Studies, University of Minnesota, 612-624-8398, malinoff@umn.edu.
- Maureen Jensen, Manager, Road Research Section, Office of Materials, Minnesota Department of Transportation, 651-366-5507, maureen.jensen@state.mn.us.

For More Information

For more information about the research in this fact sheet, please contact:

- Roger C. Olson, P.E., Research Operations Engineer, Minnesota Department of Transportation, 651-366-5517, roger.olson@state.mn.us